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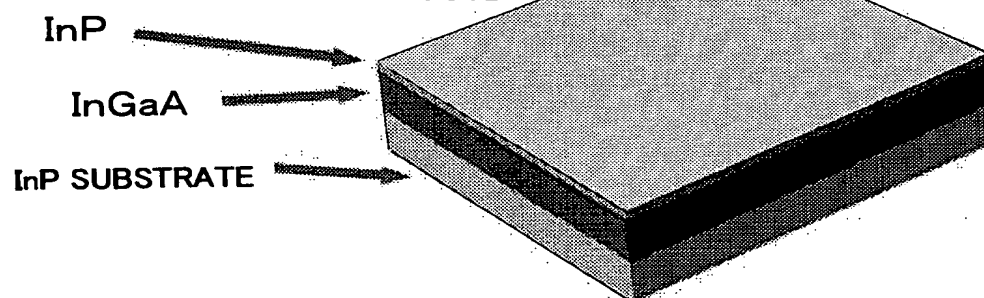


# FIG. 2(a)

FABRICATION OF AIR BRIDGE TYPE TWO-DIMENSIONAL PHOTONIC CRYSTAL PLATE

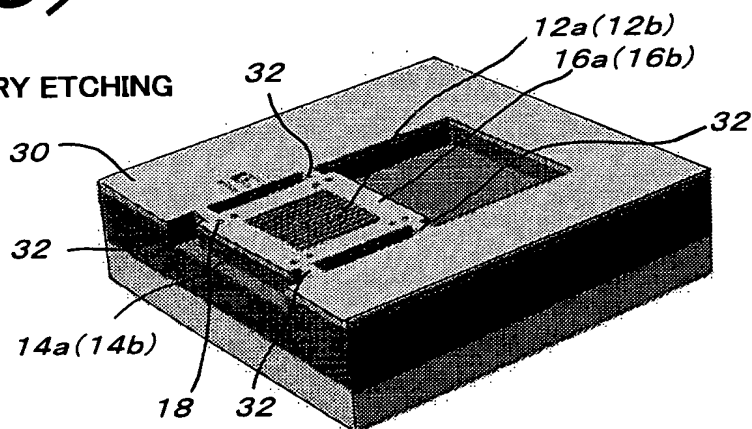
InP/InGaAs LAYER GROWTH

ACCORDING TO MOCVD



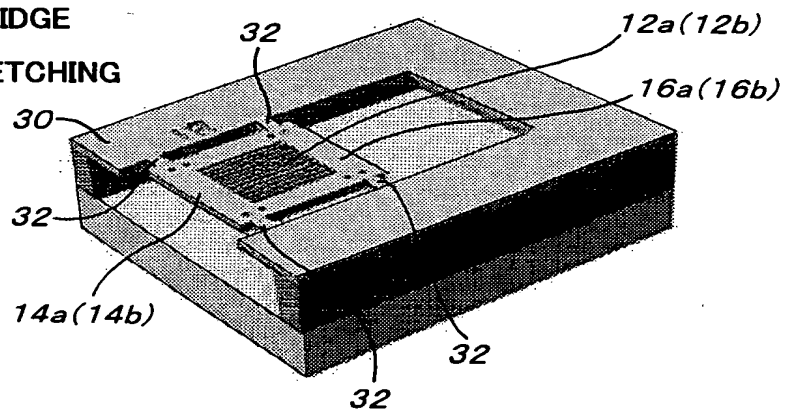
# FIG. 2(b)

EB LITHOGRAPHY & DRY ETCHING



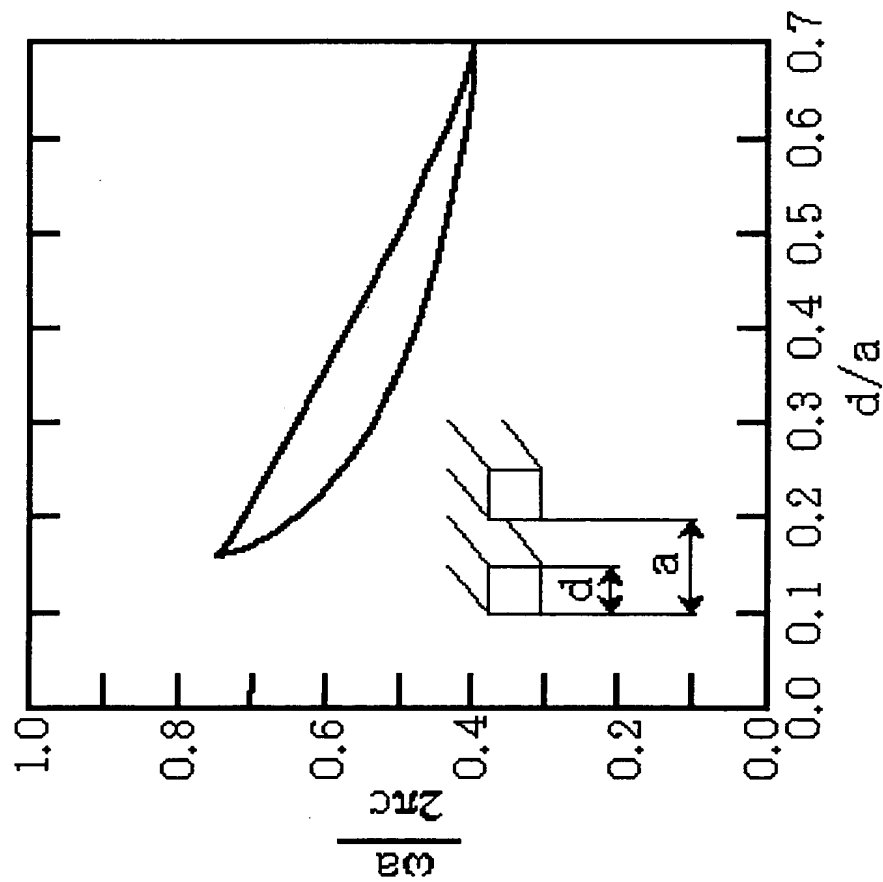
**FIG. 2(c)**

MAKING TO BE AIR BRIDGE  
ACCORDING TO WET ETCHING



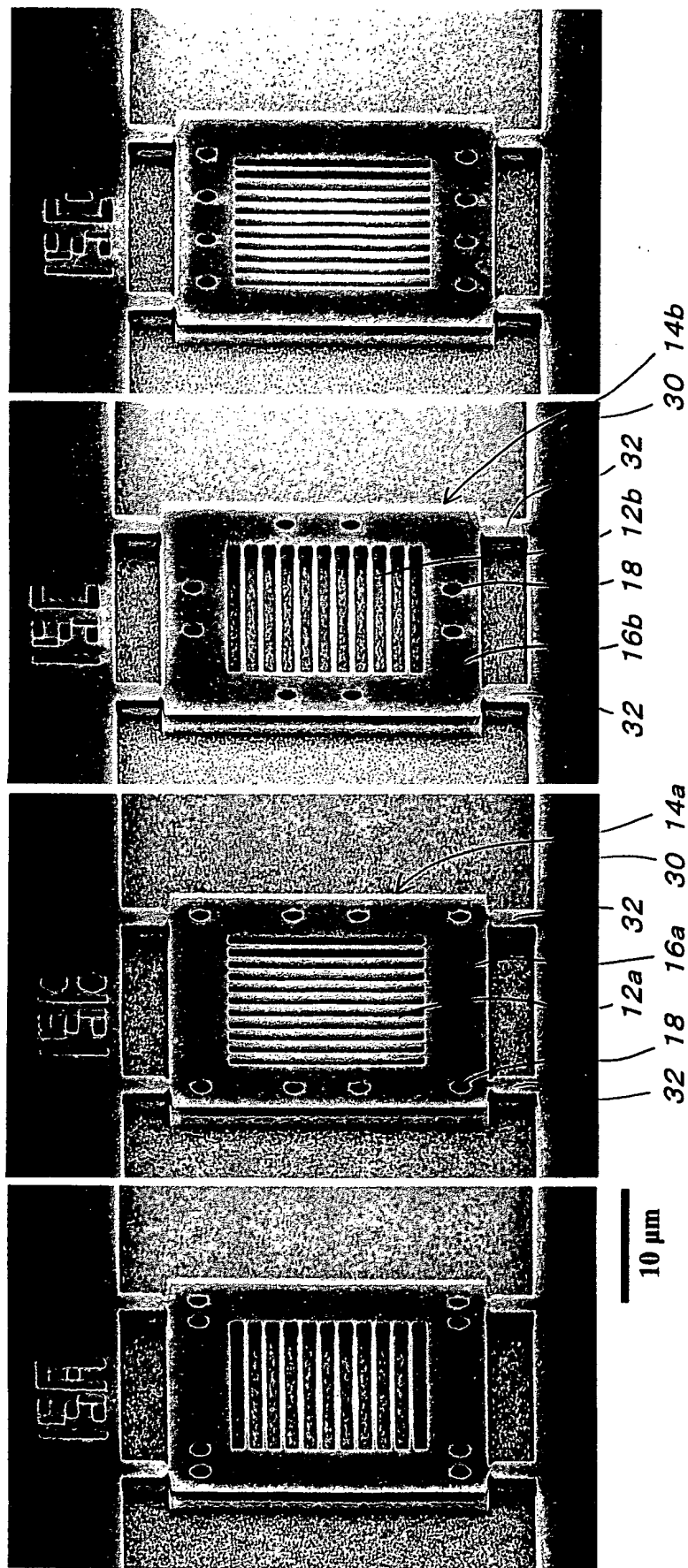
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**FIG. 3**



RELATIONSHIP BETWEEN RATIO OF WIDTH OF BLOCK AND ITS PERIOD,  
AND REGION WHERE BANDGAP OF 4 MICRON BAND OPENS IN CASE WHEN  $\text{InP}$  PLATE  
THICKNESS IS 0.5 MICROMETER

FIG. 4

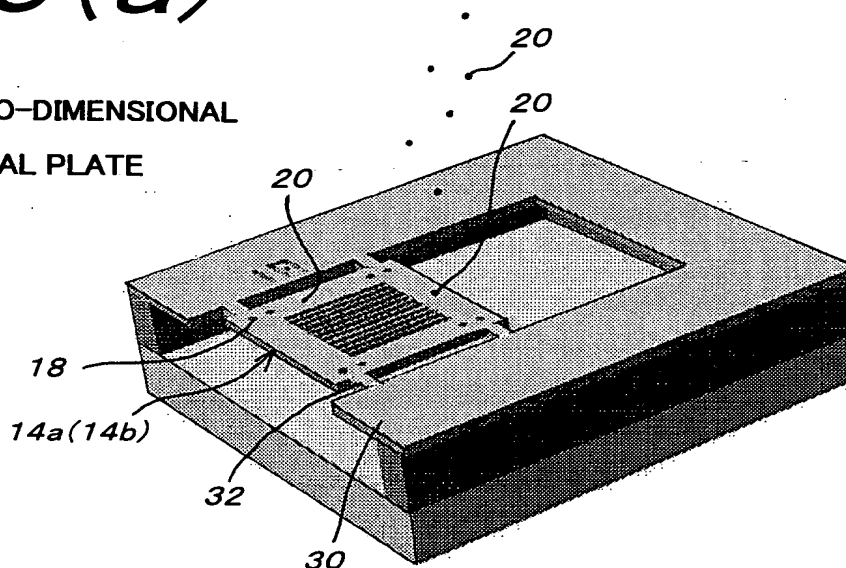


TWO-DIMENSIONAL PHOTONIC CRYSTAL PLATES

EACH HELD BY NARROW FOUR BRIDGES IN MIDAIR

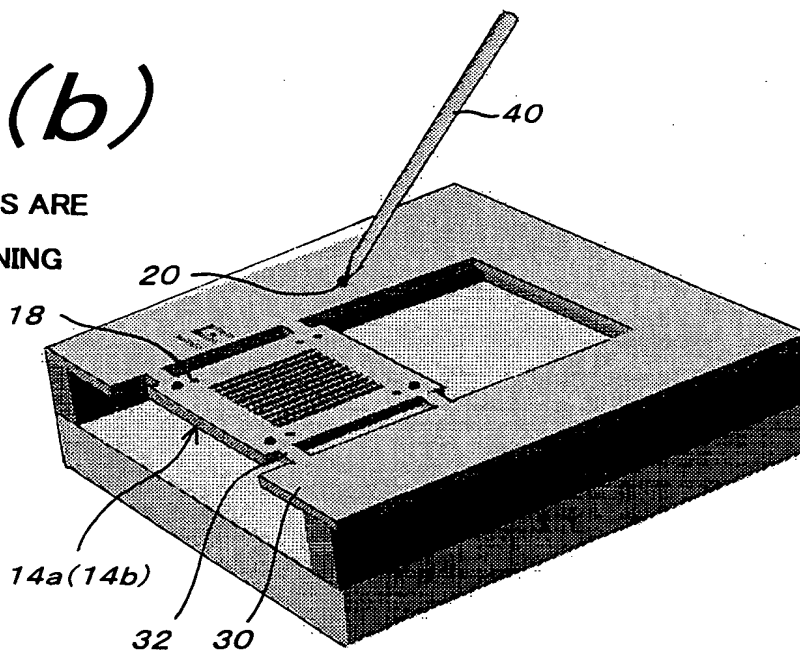
**FIG. 5(a)**

AIR-BRIDGING TWO-DIMENSIONAL  
PHOTONIC CRYSTAL PLATE



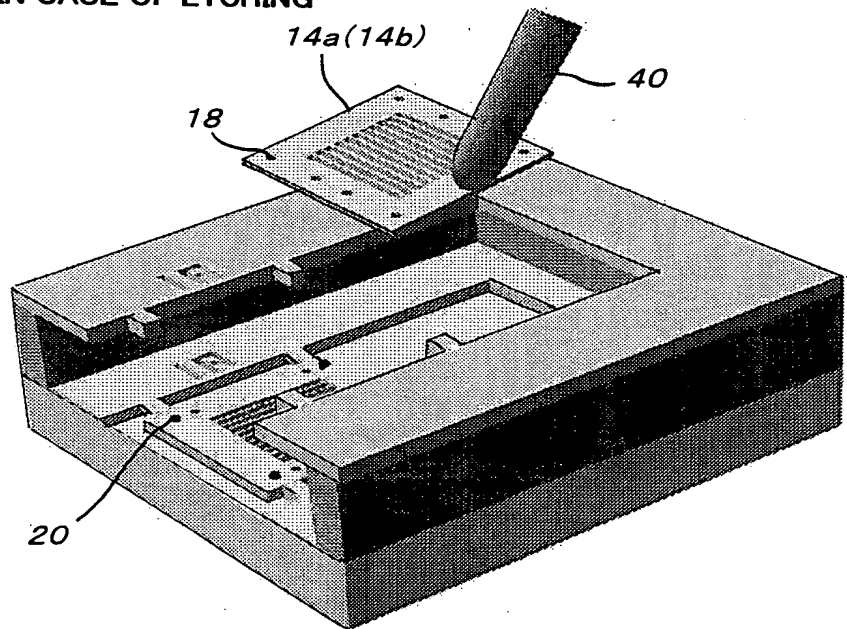
**FIG. 5(b)**

LOCATING MICROSPHERES ARE  
INSERTED INTO POSITIONING  
THROUGH HOLES



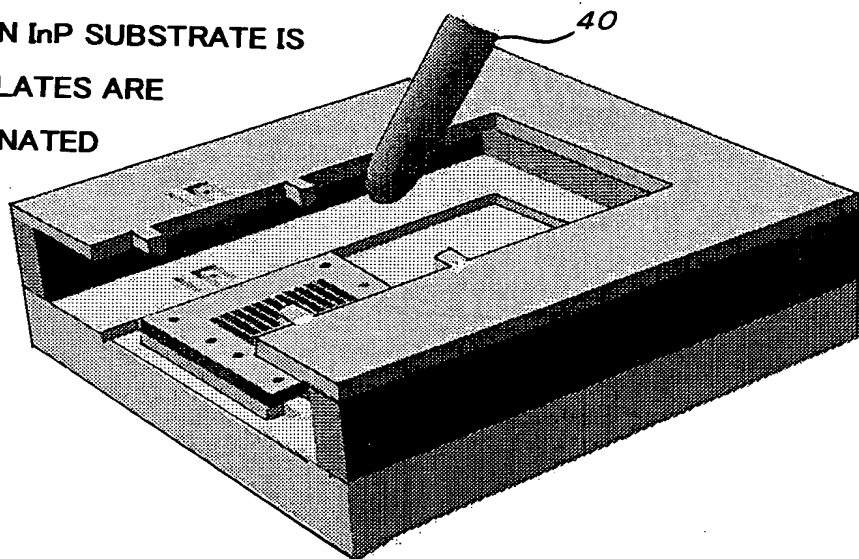
# FIG. 6(a)

PATTERN IS TRANSFERRED DOWN  
TO InP SUBSTRATE IN CASE OF ETCHING



# FIG. 6(b)

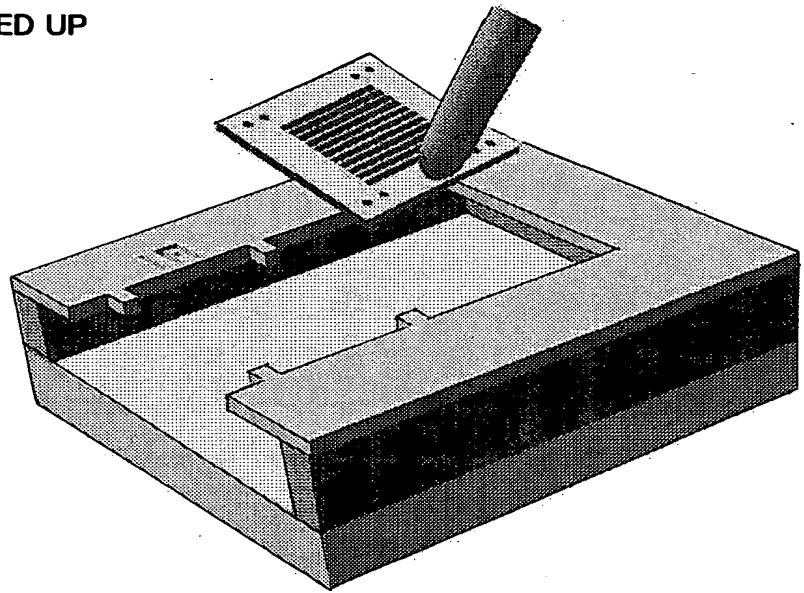
PATTERN ETCHED ON InP SUBSTRATE IS  
FIRST LAYER, AND PLATES ARE  
SEQUENTIALLY LAMINATED  
THEREON





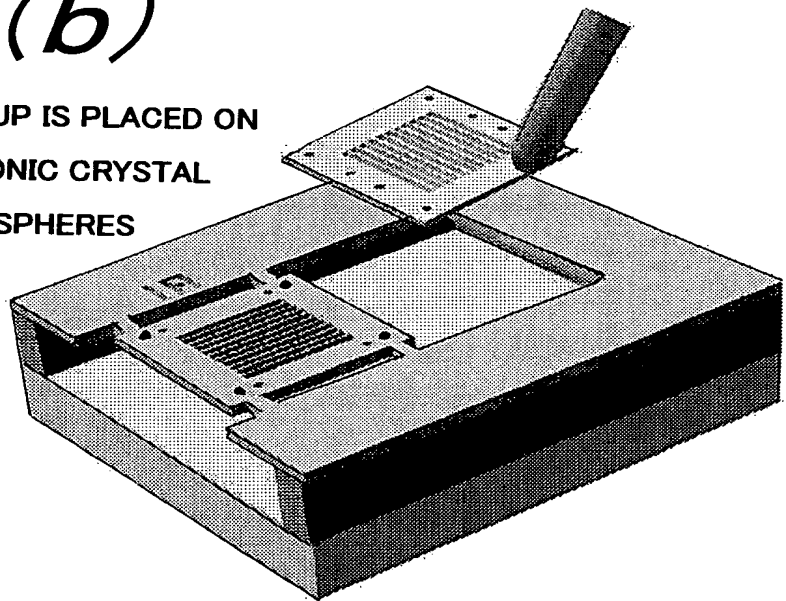
## *FIG. 7(a)*

ANOTHER TWO-DIMENSIONAL PHOTONIC CRYSTAL PLATE  
IS CUT OFF AND PICKED UP



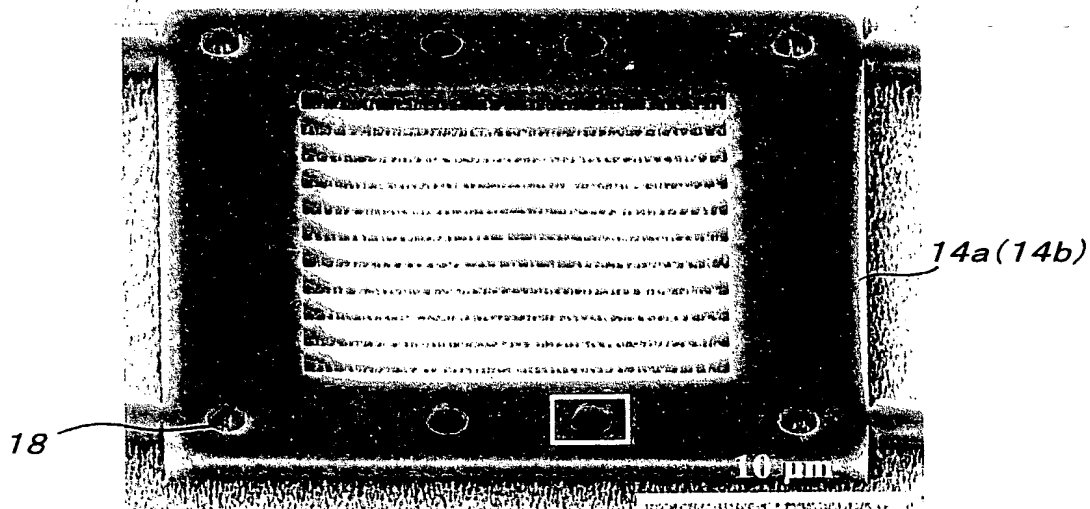
## *FIG. 7(b)*

THE PLATE THUS PICKED UP IS PLACED ON  
TWO-DIMENSIONAL PHOTONIC CRYSTAL  
PLATE INTO WHICH MICROSPHERES  
HAVE BEEN INSERTED



**FIG. 8(a)**

SPHERES ARE INSERTED INTO POSITIONING HOLES IN PATTERNS  
TRANSFERRED ON InP SUBSTRATE

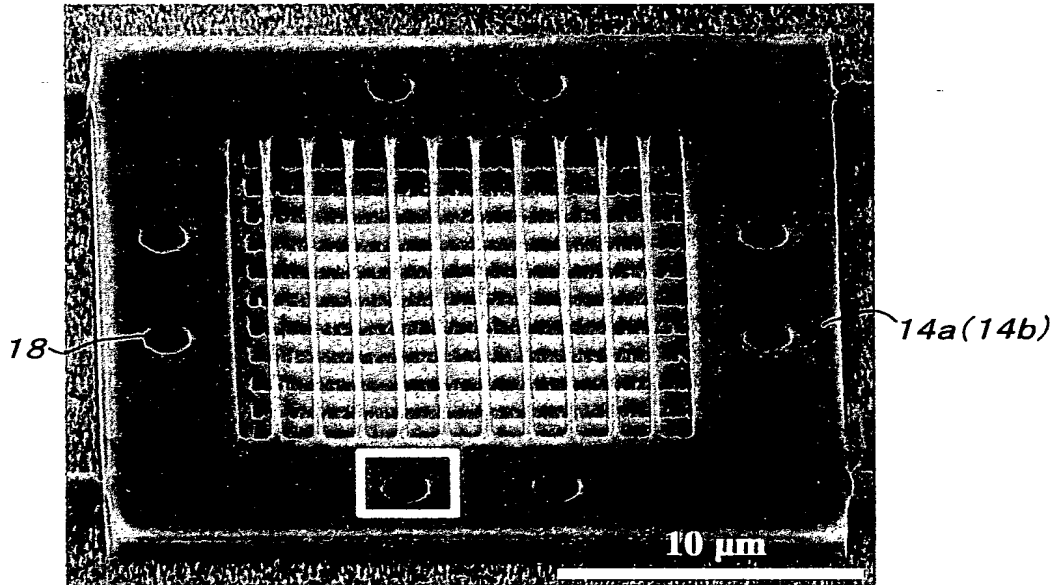


**FIG. 8(b)**

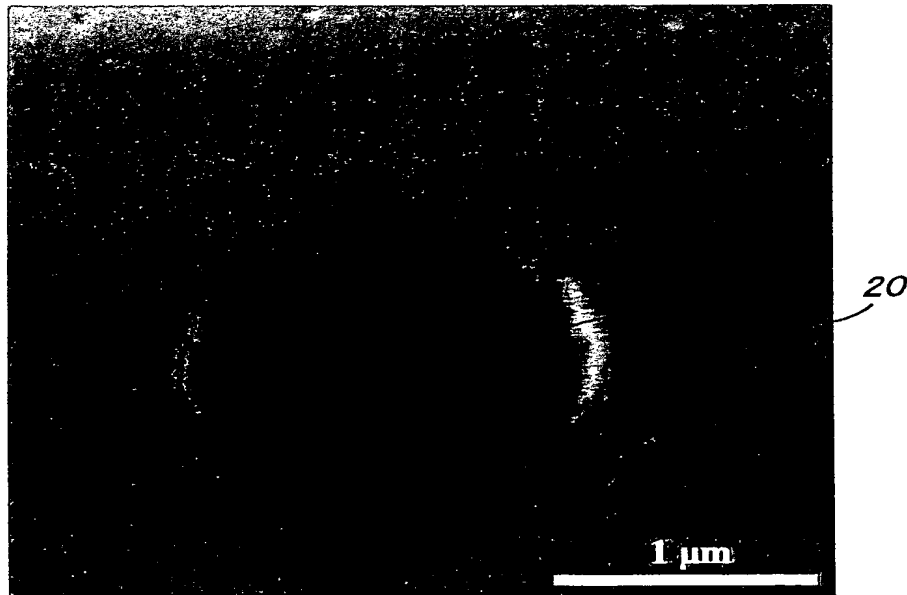


*FIG. 9(a)*

TWO-LAYER LAMINATION

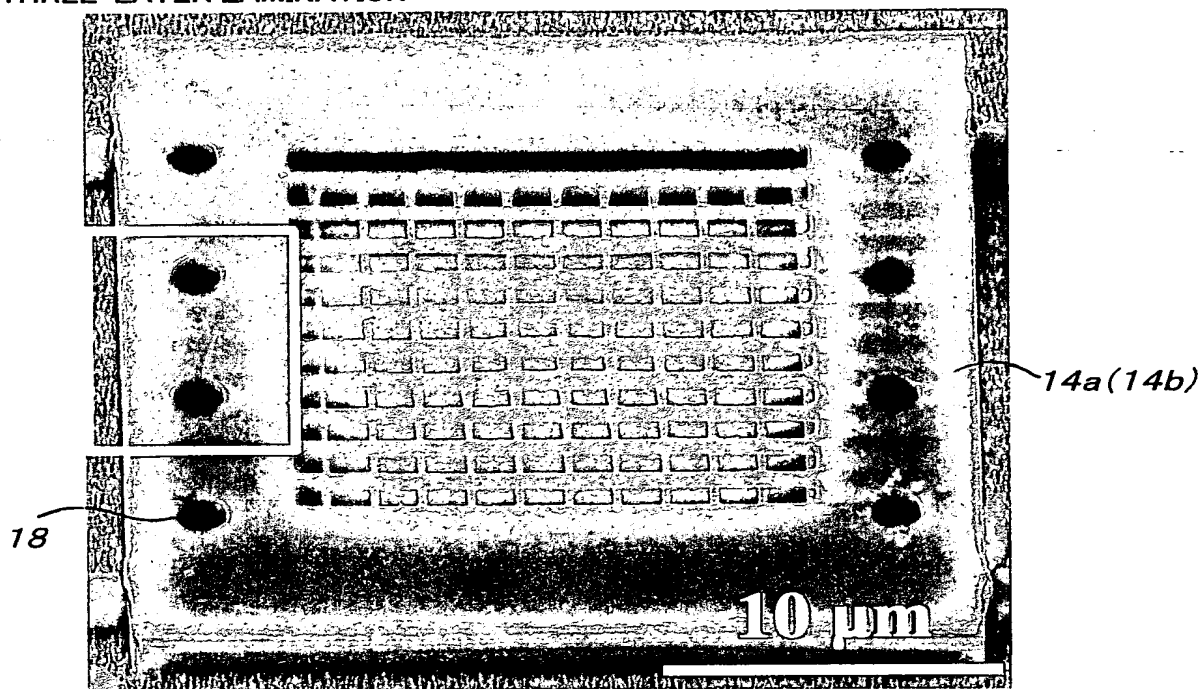


*FIG. 9(b)*



**FIG. 10(a)**

THREE-LAYER LAMINATION



**FIG. 10(b)**

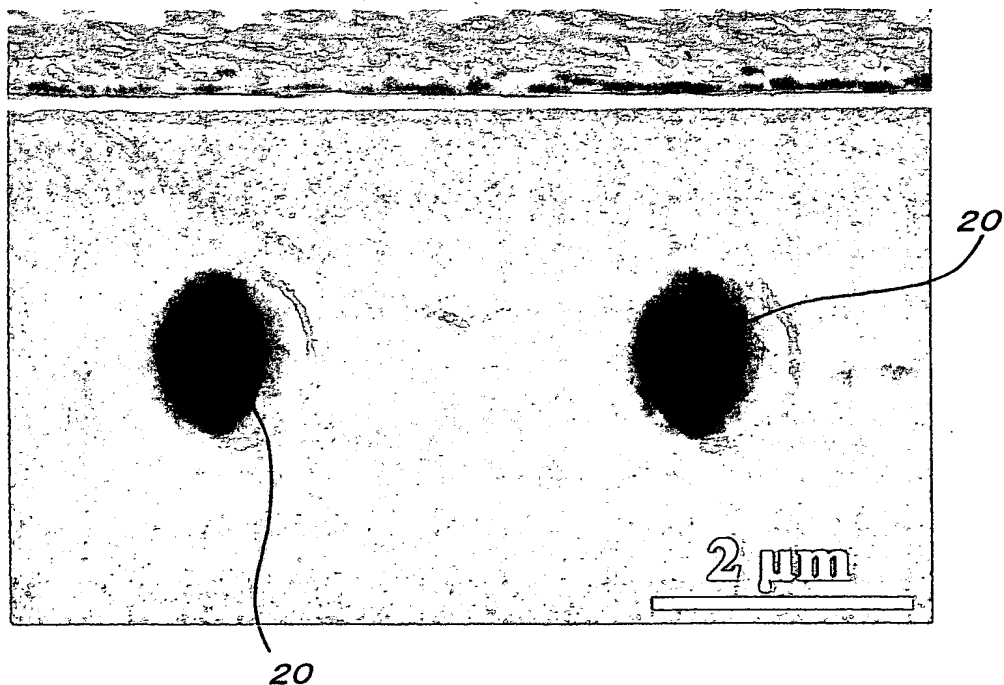
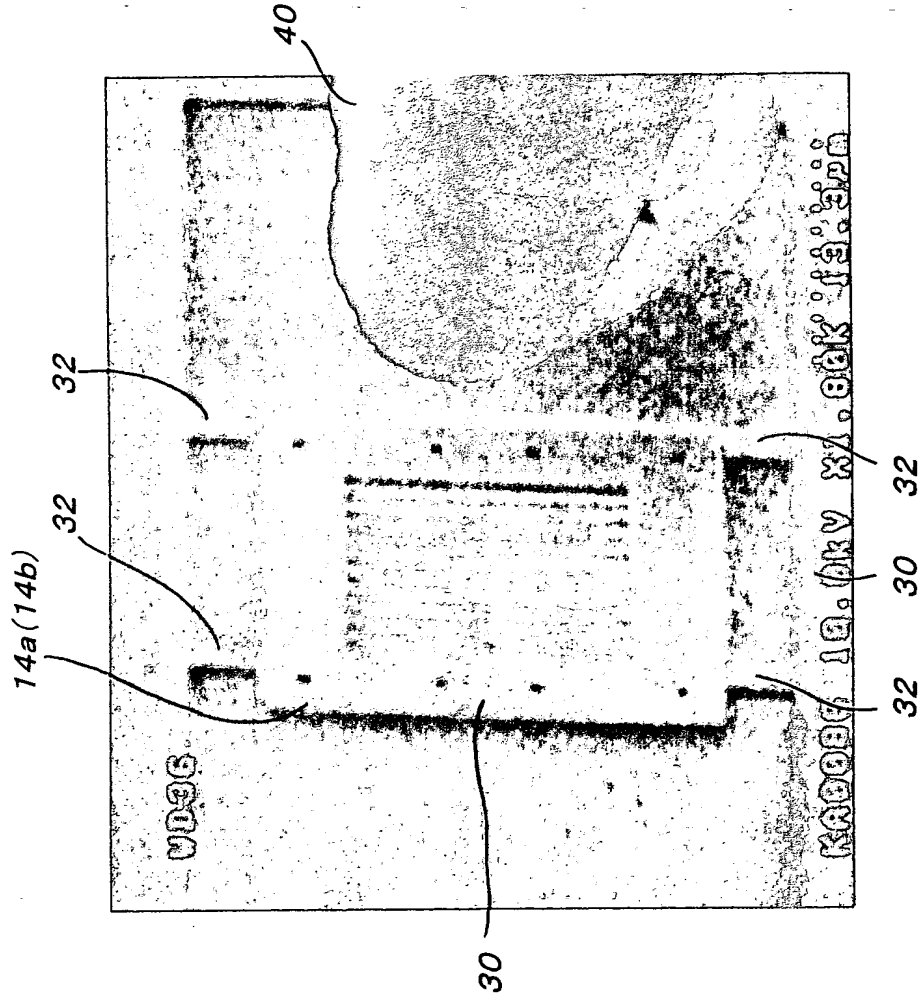
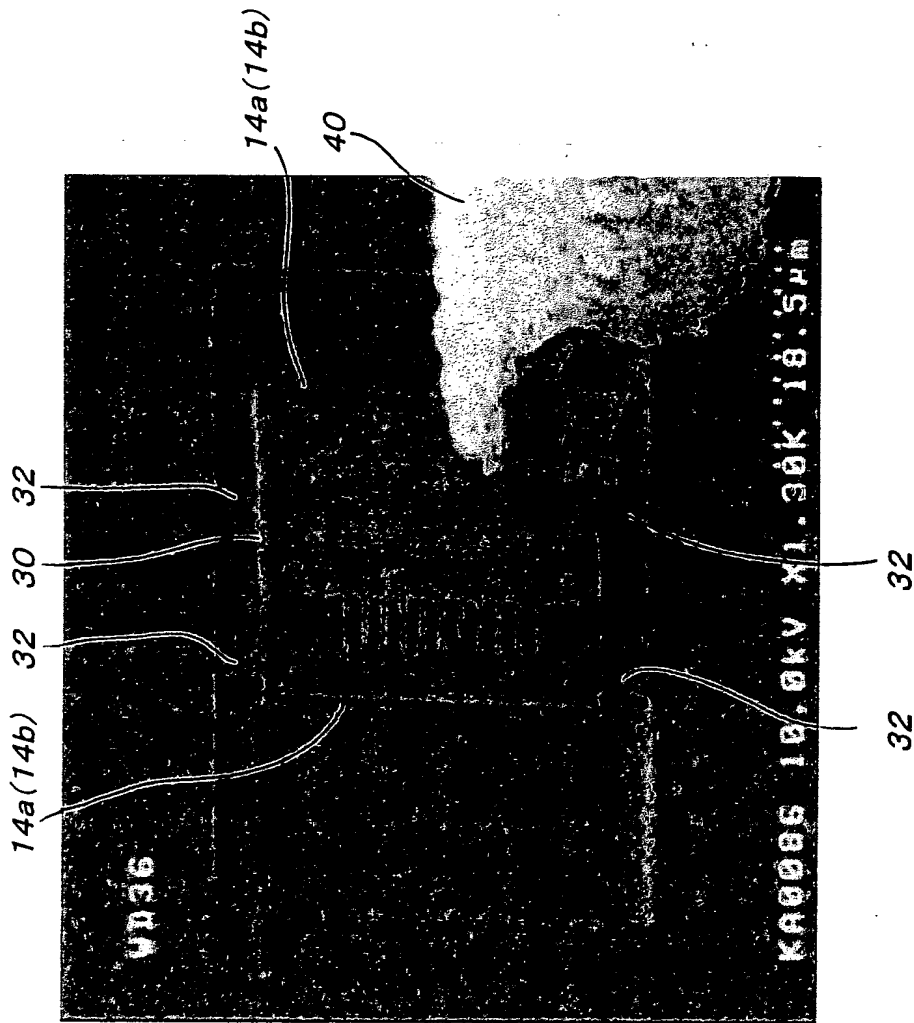


FIG. 11



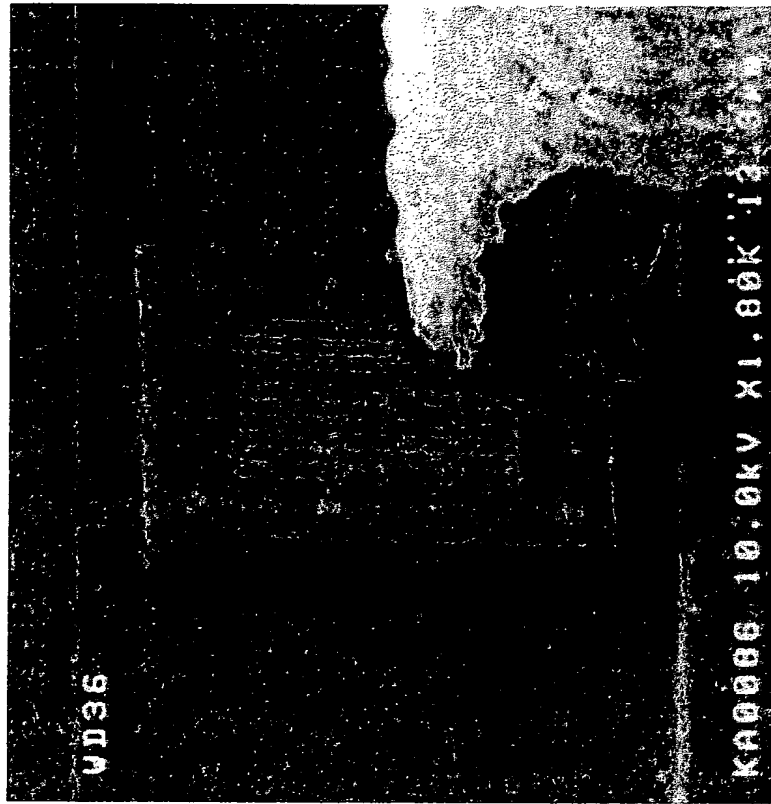
STATE WHEREIN BRIDGES ARE PUSHED BY PROBE  
TO CUT OFF TWO-DIMENSIONAL PHOTONIC CRYSTAL  
PLATE FROM OUTER HULL REGION OF SUBSTRATE

FIG. 12



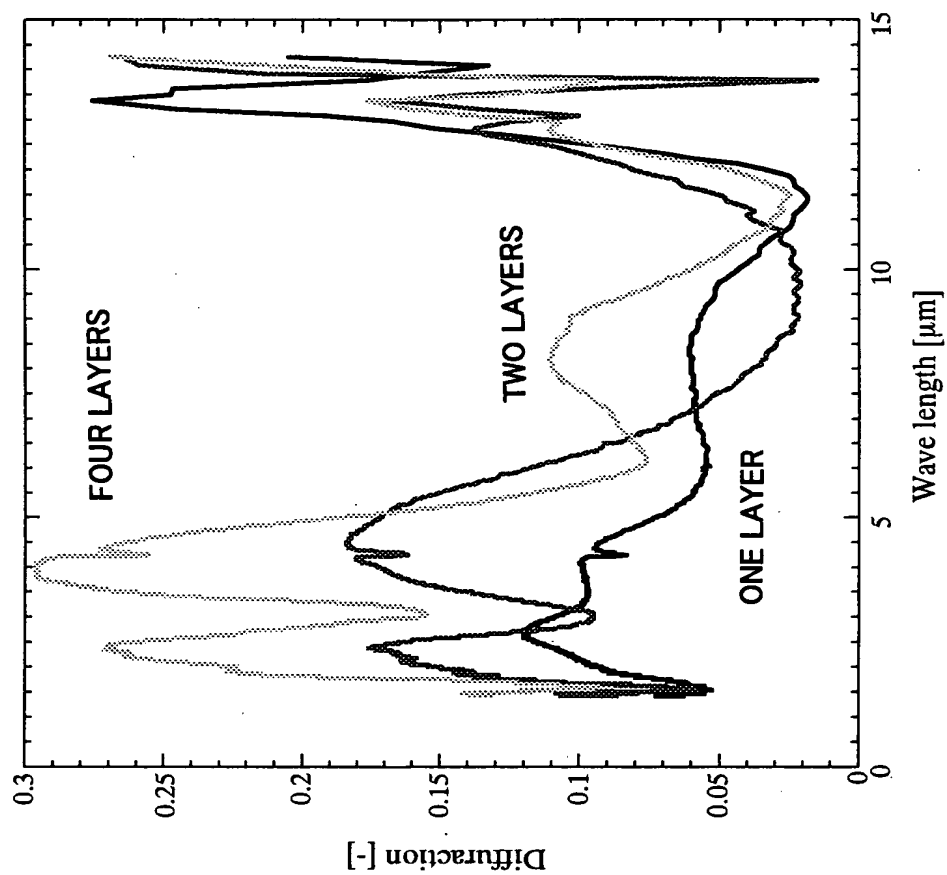
STATE WHEREIN TWO-DIMENSIONAL PHOTONIC CRYSTAL PLATE WHICH HAD BEEN CUT OFF AND HAS BEEN PICKED UP BY PROBE IS BROUGHT ON TWO-DIMENSIONAL PHOTONIC CRYSTAL PLATE INTO WHICH POSITIONING MICROSPHERES HAVE BEEN ALREADY INSERTED

**FIG. 13**



STATE WHEREIN TWO-DIMENSIONAL PHOTONIC CRYSTAL PLATES  
HAVE BEEN SUBSTANTIALLY PERFECTLY SUPERPOSED

**FIG. 14**



REFLECTION SPECTRA OF THREE-DIMENSIONAL PHOTONIC CRYSTAL



FIG. 15(a)

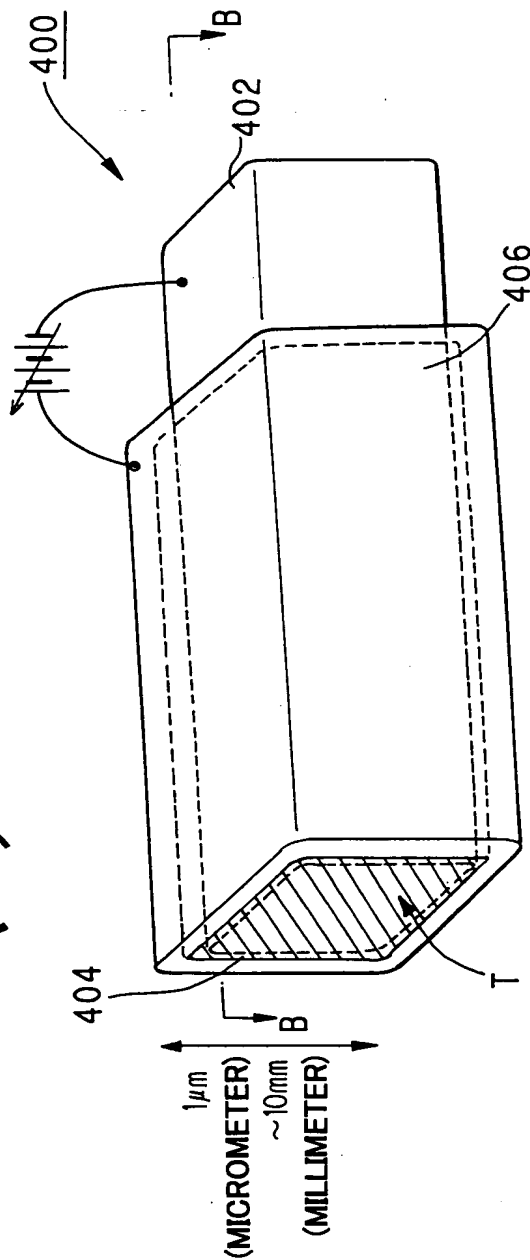


FIG. 15(c)

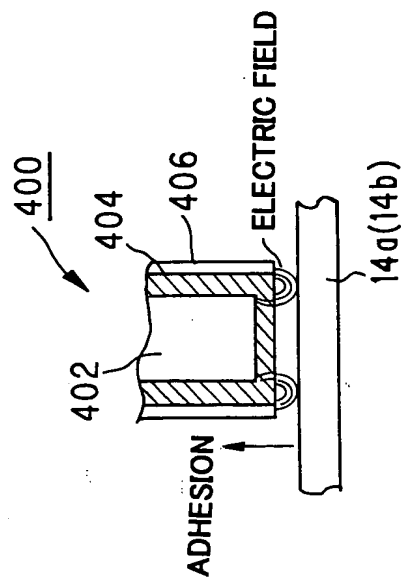
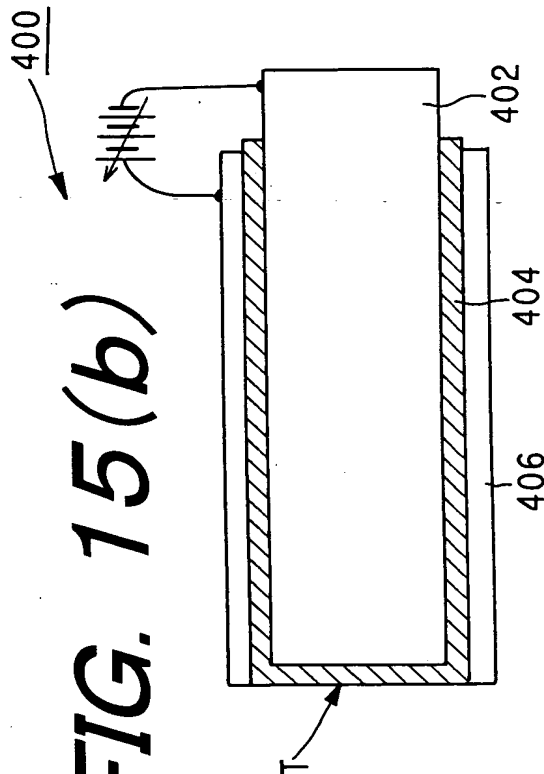
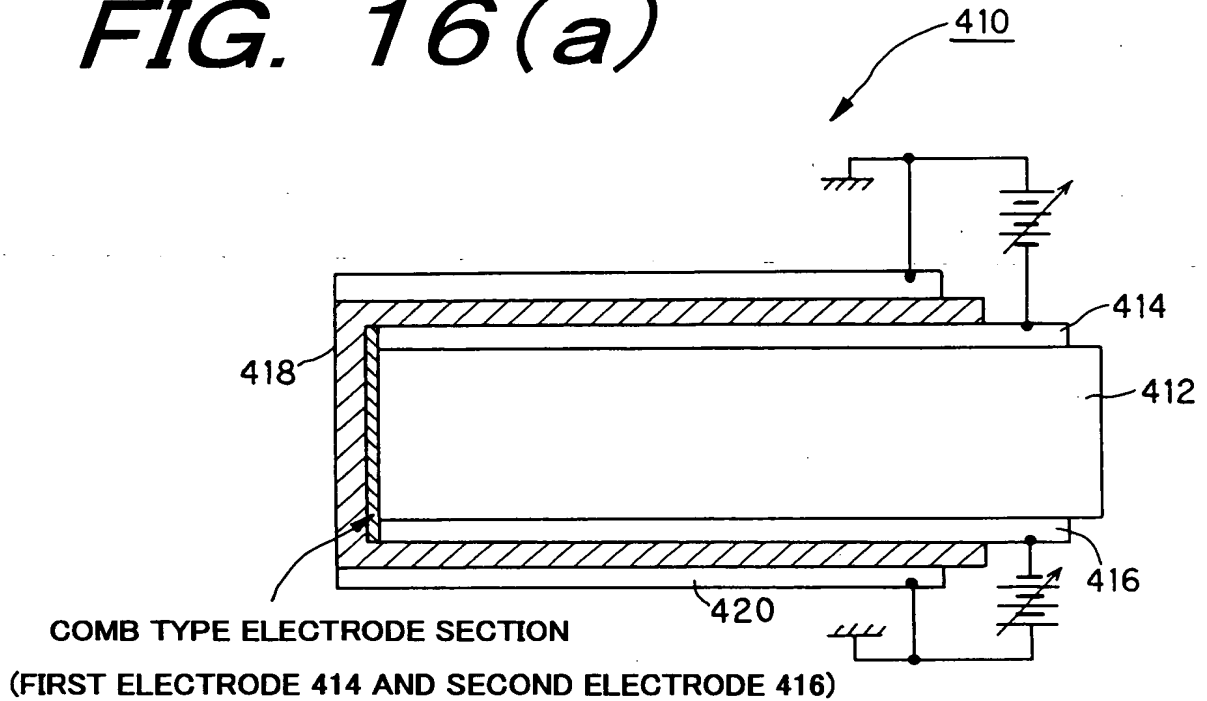


FIG. 15(b)



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**FIG. 16(a)**



**FIG. 16(b)**

FIGURE SHOWING THE CASE WHEN ONLY FIRST ELECTRODE 414 AND SECOND ELECTRODE 416 ARE FORMED

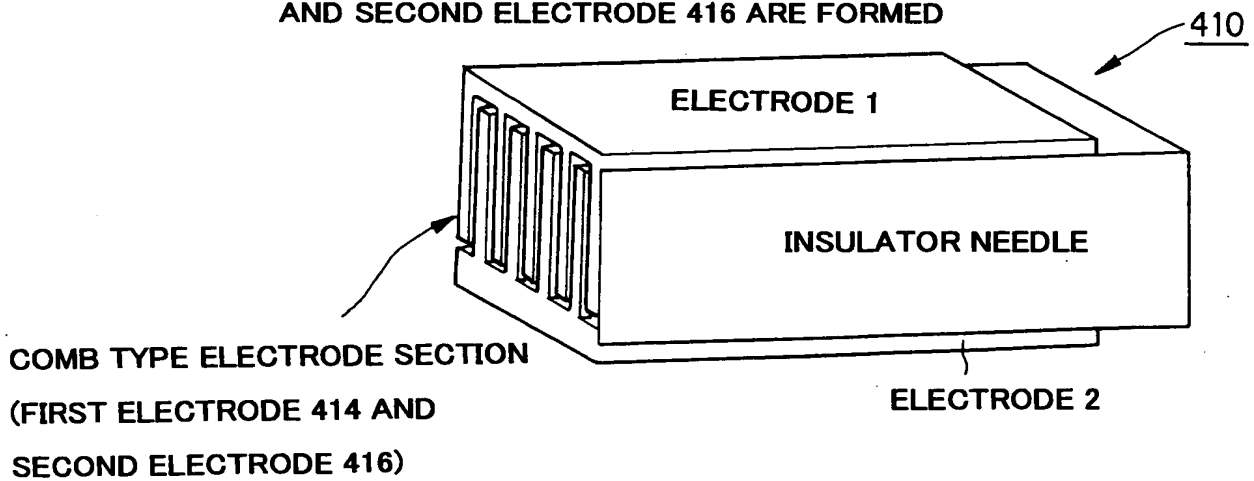
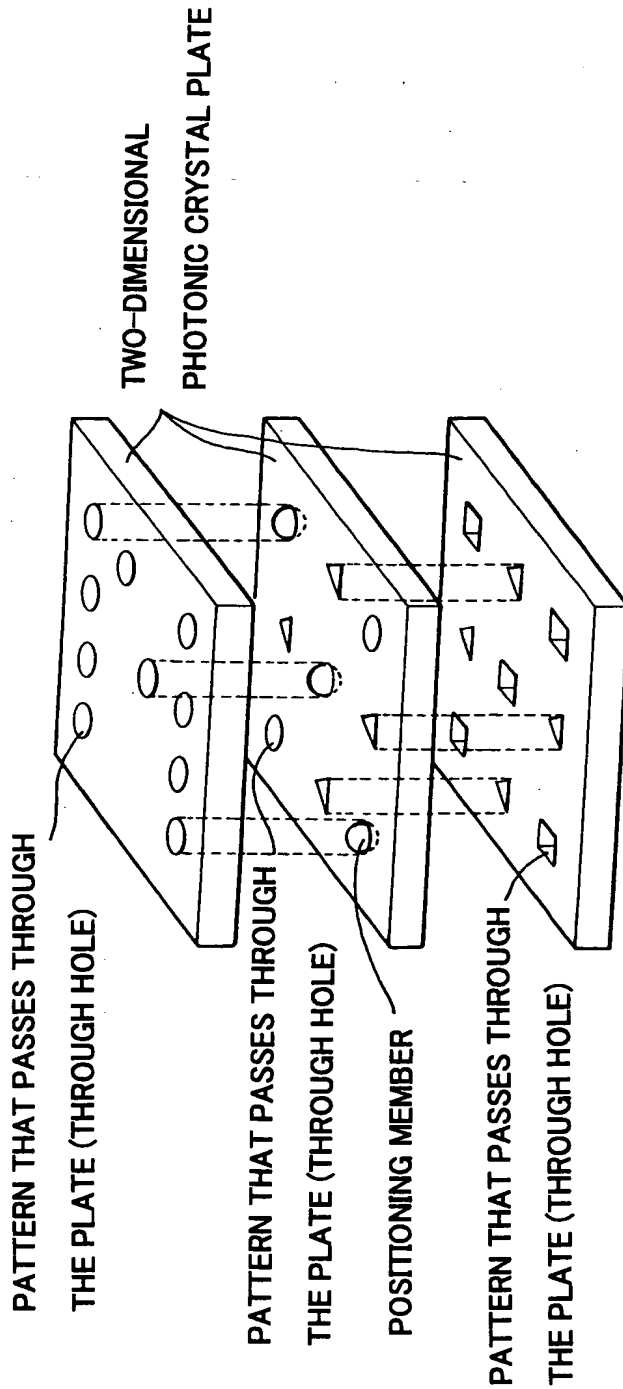


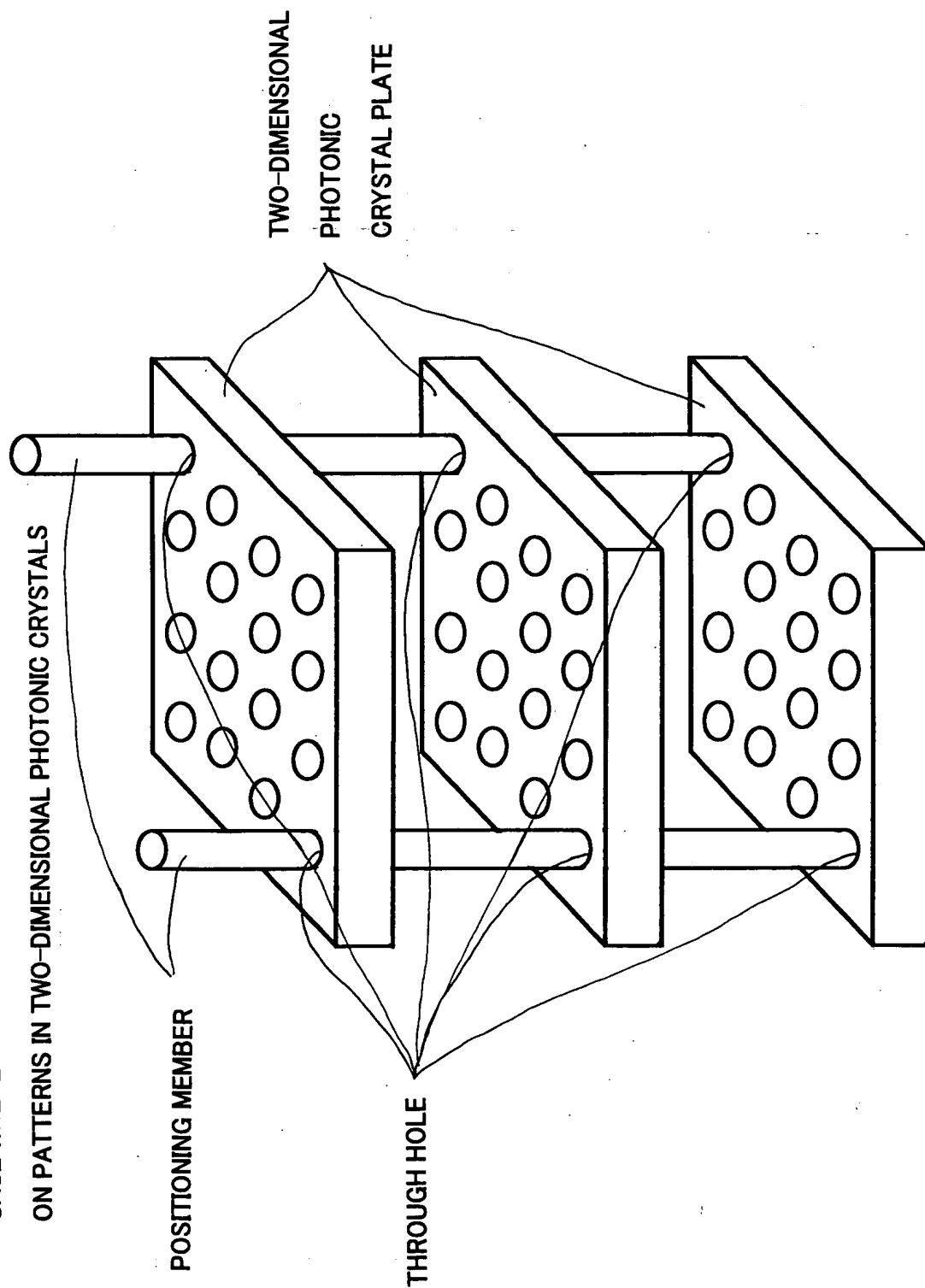
FIG. 17(a)

CASE WHERE A PART OF PATTERNS IN TWO-DIMENSIONAL PHOTONIC CRYSTAL  
IS USED TO CONDUCT POSITIONING

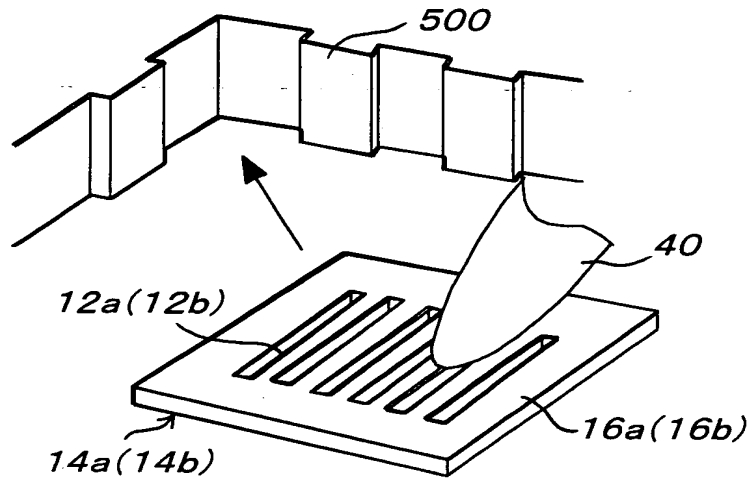


**FIG. 17(b)**

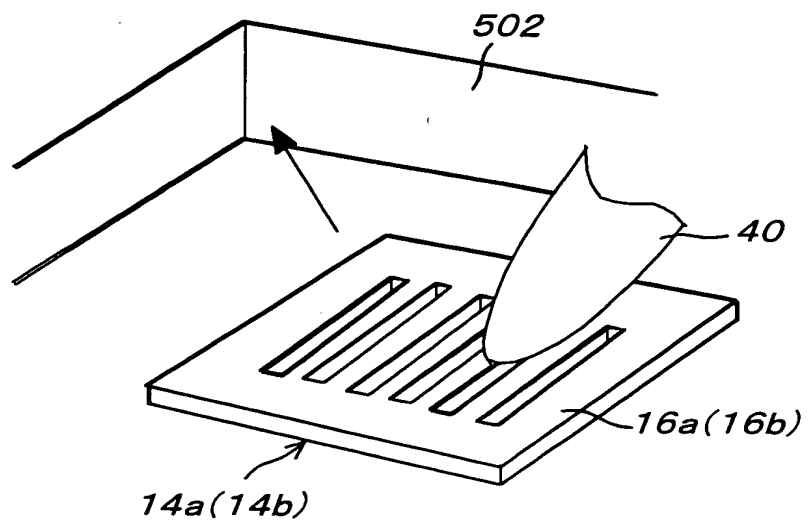
CASE WHERE POSITIONING IS CONDUCTED BY USING THROUGH HOLES DEFINED  
ON PATTERNS IN TWO-DIMENSIONAL PHOTONIC CRYSTALS



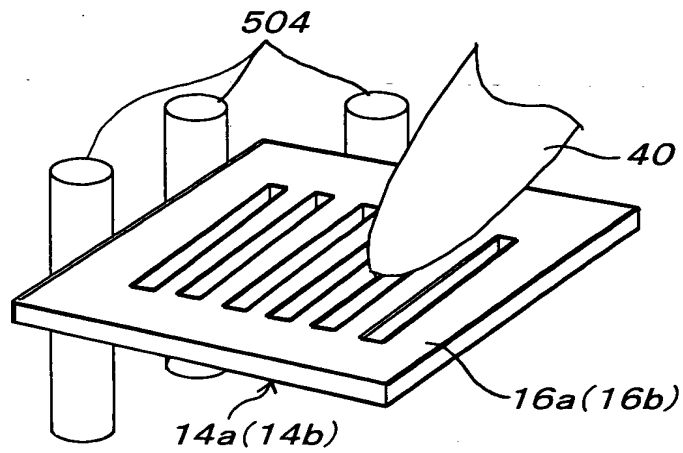
**FIG. 18(a)**



**FIG. 18(b)**



**FIG. 18(c)**



**FIG. 18(d)**

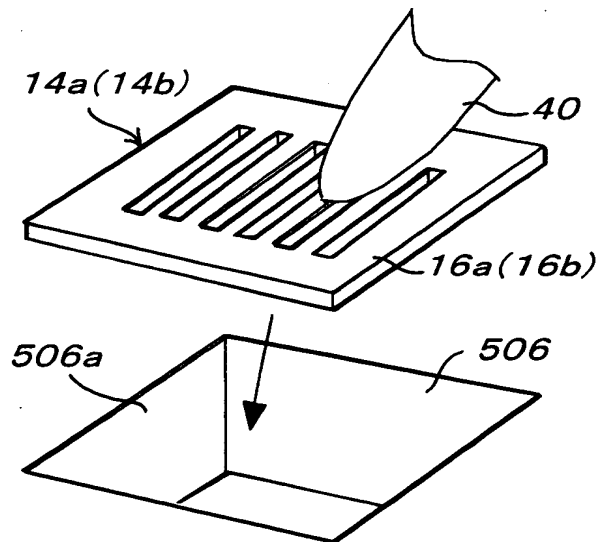


FIG. 19(a) FIG. 19(b)

